

Reservoir Scandate Cathode for Electric Propulsion, Phase II

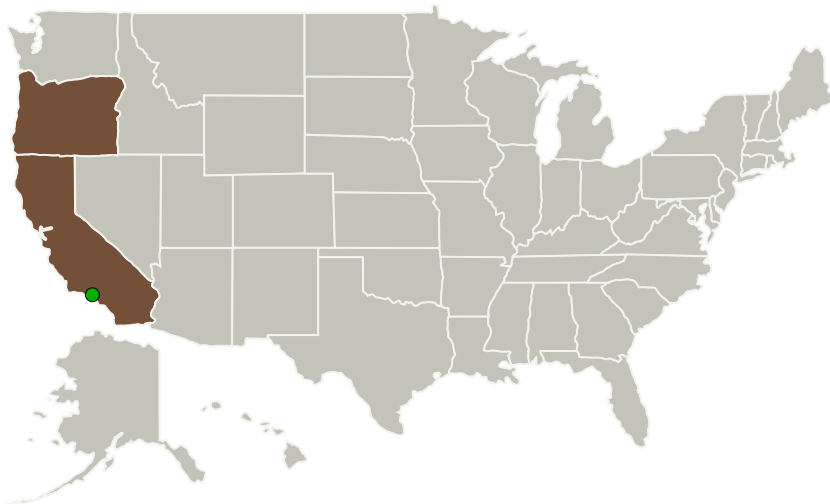
Completed Technology Project (2015 - 2017)



Project Introduction

We propose to combine the two most powerful cathode technologies into one hollow cathode assembly for use in ion and Hall-effect thrusters. Together, these technologies will boost ion thruster performance and life beyond current art. Reservoir cathodes have demonstrated, in microwave tube environments, lifetimes beyond 100,000 hours with no drop in output. Scandate impregnated cathodes have demonstrated emission beyond 10 amps/cm² at 800 degrees Cb(W) and emission levels over 100 amps/cm² at under 1000 degrees Cb(W). This is over 200 degrees below comparable all-tungsten impregnated cathodes, the cathode normally used for space propulsion. High temperature is the great enemy of long cathode life. Longer-life cathodes are needed for interplanetary and lunar missions, as well as earth-escape and near-earth maneuvers. In Phase II, we shall continue developing the hybrid scandate reservoir cathode and perfect our stand-alone scandium-doped tungsten cathodes. We shall continue to improve our hollow reservoir technology. Then we will combine the two technologies into an integrated module.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
e-beam, Inc.	Lead Organization	Industry Veteran-Owned Small Business (VOSB)	Beaverton, Oregon
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California	Oregon
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Images



Briefing Chart

Reservoir Scandate Cathode for Electric Propulsion Briefing Chart
(<https://techport.nasa.gov/image/135065>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

e-beam, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Bernard K Vancil

Co-Investigator:

Bernard Vancil

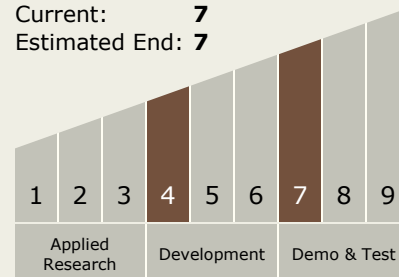
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Technology Maturity (TRL)

Start: **4**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.2 Electrostatic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System